

SUPPLEMENT No. 3 TO BENDIX VACUUM POWER SERVICE MANUAL NO. 4

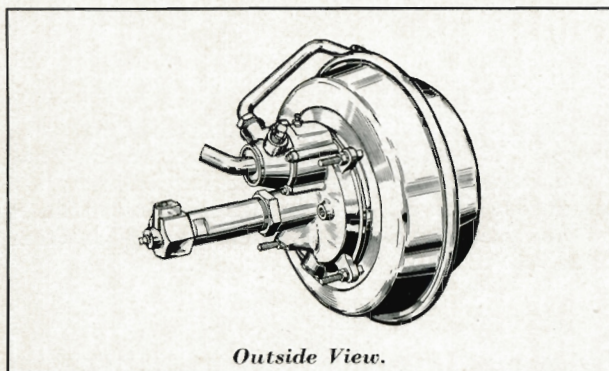
SPECIAL SERVICE INSTRUCTIONS FOR MODEL "C" DIAPHRAGM TYPE HYDROVAC

DESCRIPTION

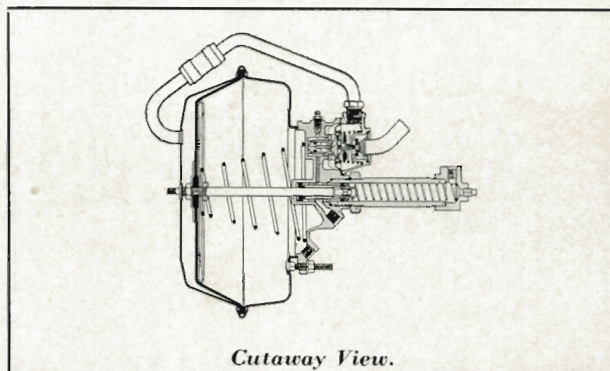
The Hydrovac is a self contained hydraulic vacuum power unit which consists of three basic units:

1. A vacuum power chamber which consists of a power diaphragm and a push rod that connect the power diaphragm to the hydraulic piston.
2. A hydraulic cylinder which contains a hydraulic piston and check valve.
3. A vacuum control valve which controls the power output of the vacuum power chamber in accordance to the hydraulic pressure developed within the master cylinder.

Illustrated below are two views of the diaphragm type Hydrovac showing the external as well as the internal construction.



Outside View.



Cutaway View.

PRINCIPLES OF OPERATION

As the brake pedal is depressed, the hydraulic pressure developed within the master cylinder is transmitted to the hydraulic piston of the control valve and to the hydraulic cylinder. As pressure is applied to the control valve piston, the vacuum port closes and the atmospheric port opens to admit air to the control end of the vacuum power chamber. As air is admitted, the forces acting upon the diaphragm are transmitted to the piston of the hydraulic cylinder through the push rod. When the push rod engages the piston, the check valve closes trapping fluid under pressure ahead of the piston.

The pressure transmitted to the wheel cylinders is the sum of the pressure developed within the master cylinder and the pressure developed as a result of the vacuum power chamber push rod thrust.

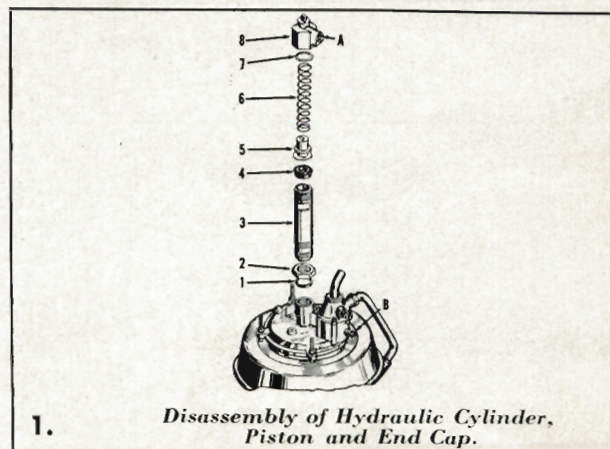
The release of pressure against the brake pedal, reduces the pressure within the master cylinder and the control valve piston chamber thus permitting the atmospheric poppet to close and the vacuum poppet to reopen to balance the vacuum on both sides of the vacuum power chamber diaphragm. The return spring then returns the diaphragm to its released position. As the hydraulic piston reaches the release end of its stroke, the check valve reopens permitting fluid ahead of the piston to return to the master cylinder to permit full release of the brakes.

BENCH OVERHAUL

The following service instructions cover the disassembly and reassembly of the Hydrovac, step by step. Use care in the handling of hydraulic system parts to prevent their coming into contact with mineral oil or greases. DO NOT HANDLE HYDRAULIC CUPS AND SEALS WITH GREASY HANDS.

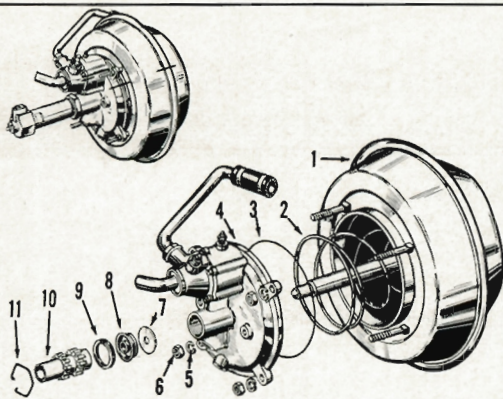
DISASSEMBLY

1. Loosen check nut (2) and unscrew hydraulic cylinder (3) from the end plate. Remove piston (5), cup (4) and spring (6). Clamp end cap (8) in vise to loosen hydraulic cylinder (3). Then remove check nut seal (1), check nut (2), hydraulic cylinder (3) and gasket (7) from end cap.



1.

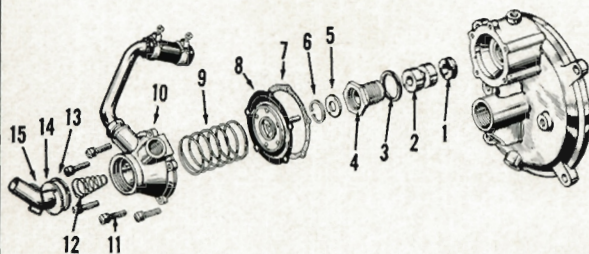
*Disassembly of Hydraulic Cylinder,
Piston and End Cap.*



Disassembly of Vacuum Power Chamber and End Plate.

2.

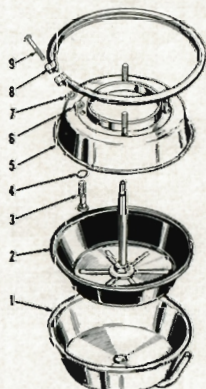
2. Scribe across two halves of diaphragm chamber and across end plate and control valve housing as shown in inset upper left. Loosen hose clamps on control tube and slide hose toward control valve end. Remove end plate attaching nuts (6) and lockwashers (5). Separate end plate assembly (4) from vacuum power chamber (1) and remove return spring (2). Remove snap ring (11), guide bearing (10), tube seal (9), push rod seal (8) and stop washer (7) from end plate.



Disassembly of Control Valve and Piston Fitting.

3.

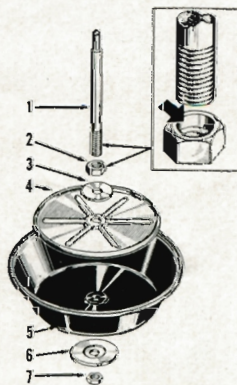
3. Remove control valve housing and valve parts (7) through (15) starting with lock ring (15) as illustrated. Remove control valve piston fitting lock ring (6) and washer (5). With a $1\frac{1}{8}$ " socket wrench remove fitting (4) and then press out piston (2). Remove cup (1) from piston and seal ring (3) from fitting (4).



Disassembly of Vacuum Power Chamber.

4.

4. Remove nut (6), lockwasher (7) and bolt (9) from clamp band (8) and then remove clamp band. Remove diaphragm shell (5) and then remove diaphragm and push rod assembly (2). Drive out attaching bolts (3) and remove seals (4).



Disassembly of Push Rod and Diaphragm.

5.

5. Clamp push rod nut (2) in a vise and remove nut (7), cupped washer (6), diaphragm (5), diaphragm plate (4) and guide washer (3). Note: If replacement of the push rod is necessary then remove nut (2) from push rod (1).

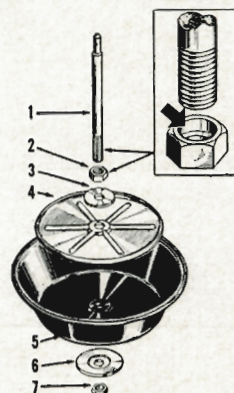
DISASSEMBLY IS NOW COMPLETED.

CLEANING

After disassembly, all parts that are to be reused should be thoroughly cleaned. Immersion in Bendix Metalclene Parts Cleaner is recommended for metal parts. After cleaning, those parts which come into contact with hydraulic brake fluid should be rewashed in clean alcohol before assembly. When overhauling a Hydrovac use all parts furnished in the Hydrovac Repair Kit. DISCARD ALL OLD RUBBER PARTS. For complete list of service parts and repair kits, see Bendix Parts Catalog 9-E, Section II.

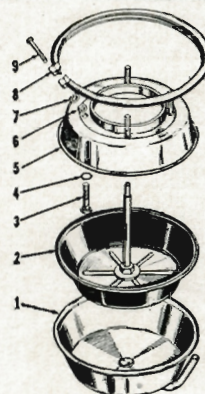
ASSEMBLY

1. Thread push rod nut (2) onto push rod to the limit of the thread. **IMPORTANT:** See enlarged view of nut (2) for correct method of assembly. Assemble guide washer (3); diaphragm plate (4), with flat side next to the diaphragm; diaphragm (5) with cupped side next to diaphragm plate; large washer (6), with concave side next to diaphragm and nut (7). Securely tighten nut (7) and stake in place.



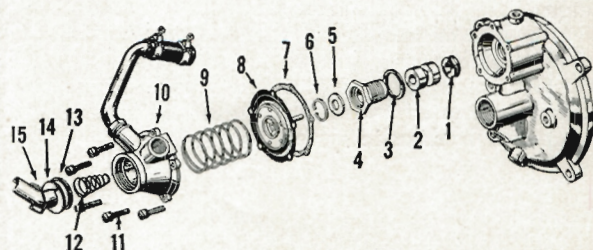
1. Assembly of Push Rod and Diaphragm.

2. Install new rubber seals (4) on bolts (3) and assemble bolts in shell (5); restake bolts in shell. Place rear shell (1) on bench and assemble diaphragm and push rod assembly (2), and front shell (5). Align shells to scribe mark and bead on diaphragm with rim of shells. Assemble clamp band (8) over rim of shells and assemble bolt (9), washer (7), and nut (6). Securely tighten nut.



2. Assembly of Vacuum Power Chamber.

3. Dip piston cup (1) in brake fluid and assemble on piston (2) with lip of cup away from hole end of piston. Insert piston in fitting (4) from threaded end with hole end of piston first. Place seal (3) on fitting and screw fitting into end plate. Tighten fitting with a 1 1/8" socket wrench. Install washer (5) and lockring (6) in fitting (4) using Truarc pliers, tool No. T-25254. Examine poppets in control valve. If damaged replace using Poppet Replacement Kit. Then assemble control valve parts 7 through 15 as shown; noting the following: Stem of diaphragm (8) goes into hole of valve piston (2), end of spring (9) goes within rim of diaphragm flange; line up valve housing (10) and end plate to scribe marks, small end of spring (12) goes in recess of poppet.



3. Assembly of Control Valve and Piston Fitting.



5.



This completes the assembly of the Hydrovac.